

## Solomon Modeling TAC Meeting

November 5, 2007

**Attendees:** USBR-Bill Peck, Jack Wergin, Mark Phillips; GMD 4- Wayne Bossert; KWO-Diane Coe, Susan Stover; DWR- Jessica Ahlquist, Scott Ross, Scott Voss, Mark Billinger, Jack Garven, Tina Alder, Andrew Lyon and Darci Paull; SSPA- Steve Larson, Alex Spiliotopoulos, Marinko Karanovic

SSPA provided an update on integrating the RRCA model with the tail end of the Upper North and South Fork Solomon River basins. The RRCA "Ogallala" model grid cells are 1mile by 1mile where as the Solomon alluvial model cells are 660 ft (1/8 mile). There are 64 Solomon model cells in one RRCA model cell.

The model is currently in steady state condition. The recharge is currently a nominal value of 1"/year which was transferred from the regional RRCA model to the alluvial portion of the Solomon. The 1"/year recharge is producing base streamflow that is similar to the USGS gaging stations recorded streamflow.

The group reviewed the water budget. An estimated 42, 500 acre-feet of inflow was calculated, which includes the boundary of the regional model and the incidental surface recharge. There is 20,600 acre-feet of outflow which was calculated from the RRCA model. There is 20,000 acre-feet net inflows. This will later become time varying recharge curves once SSPA receives the irrigated land coverage from DWR.

The wells are pumping on average 3800 acre-feet (2006). This will go to a monthly time-step starting in 1944 to present. The precipitation value represented in the water budget is a component of recharge. The other two values represented in the water budget were streams and rivers. Streams are the discharge to the stream (16,700 acre-feet) and 1391 acre-feet to Kirwin Reservoir is the River value.

Stream gages Glade and Bow Creek near Stockton will be important gages for calibration. The base flows at Glade appear to be pretty consistent (don't vary much throughout the month) during the winter time when they are not affected by ET and diversions. The average base flow appears to be around 10-15 cfs. Bow Creek near Stockton, average baseflow is estimated at 5-10 cfs during the wintertime. There doesn't appear to be a long term impact on baseflow by groundwater development, only about 25% depletion of the inflow, which is considered low. The model is calculating stream leakage close to the measured flows at the gages.

The average water level within the model domain of the North Fork is within 20-30 feet of the actual measured water levels. A trend exists in the residuals (difference between the computed value and the measured value). The residuals are too high in the west and

too low in the east. This will need to be reviewed. A value of 100 ft/day of hydraulic conductivity was used for the alluvium. Approximately 30 wells will be used for calibration.

DWR is gathering monthly pumpage estimates. If this can not be obtained then something else will need to be calculated. Middle Arkansas and RRCA are examples.

A comparison of the stream elevation values for the Solomon versus the RRCA shows the Solomon values are higher than the regional model. This could be a result of the Solomon being surveyed values versus RRCA calculated from DEM. Need to figure out how to reconcile.

The South Fork model is at the same stage as the North Fork. All the same concepts have been applied.

Tributary contributions to the alluvial system were reviewed. Drainage cells that are near the stream may get moved closer to the stream and a loss factor calculated. SSPA will provide TAC with a map of the drainage cells, discharge points to review and determine which ones to use. This will be discussed at the next meeting. Stockton crew will likely conduct field reconnaissance to determine rate of discharge to the stream.

SSPA needs coverage on phreatophytes for the ET data. File was thought to be sent by DWR, but will double check (File has now been sent to SSPA).

A TAC discussed the hydrologic conditions and concerns in the basin. The data is showing no long-term decline and that the variations that are present are likely attributed to climatic conditions. A review of the reservoir data will be conducted as USBR commented that up until approximately 1980 the reservoirs (Kirwin and Webster) would recharge enough to provide a sufficient water supply to the irrigation districts and that after this time (with the exception of the extremely wet period in the 90's) a dependable supply to the districts has not been provided. The inflows have obviously declined since the reservoirs were constructed. Base flows into these reservoirs most likely began to decline well before 1980 and continued to decline until the early 90's. It was questioned whether the decline could be attributed to less runoff and Scott offered up a report by KGS. This report will be located and sent to SSPA.

#### Action Items

1. DWR transmit irrigated acres data to SSPA
2. DWR transmit monthly pumpage estimates (if possible) to SSPA
3. DWR forward a copy of the KGS report to SSPA
4. SSPA forward a map with drainage cells for review by TAC
5. DWR review pumpage data sent to SSPA to see if municipal was included and transmit to SSPA the location of these diversion points.

The next TAC meeting is Thursday, November 29, 2007 at 1pm (CDT).

